after him Wislicenus, assumed that both were capable of rotating in opposite directions about a common axis; this possibility ceased, however, with a double or treble linking of the carbon atoms. Wislicenus further called into play the action of certain "specially directed forces the affinity-energies" which "determine the relative positions of the atoms to one another in the molecule."

The *Annalen* of these years contain a large number of papers worked out in the Leipzig laboratories under his direction, in which the reactions of maleic and fumaric acids, the tolane dichlorides and dibromides, mesaconic and citraconic acids, the crotonic acids, the α-chloropropylenes, &c., were carefully investigated, and the facts shown to be in agreement with those demanded by theory.

The hypothesis naturally evoked much criticism; Wislicenus's controversy with Fittig (*Liebig's Annalen*, 1892, cclxxii. 1-99) is still fresh in the minds of chemists, and it must be admitted that Michael has obtained results which it has not yet been found possible to reconcile with the theory. But when all is said, there can be little doubt that up to the present it remains the simplest and most comprehensive explanation adduced. Even if the theory should ever be disproved, Wislicenus's memoir will always hold a place among the classics of the science as a model of careful reasoning and literary skill, and as an epitome of one of the most laborious researches of that period.

Now, however, is not the time, nor is this the place, to dwell in any detail on his scientific papers; the above indication of the direction which his research took must suffice; it would be presumptuous to attempt to estimate the value of his work; enough that, among the great names in the history of chemical science, Wislicenus will stand with Bunsen and Kekulé and Victor Meyer and such names as made the nineteenth century what it was.

We do not wish to enter into a panegyric of his character; such things belong rather to the columns of a daily paper and to the exaggerated estimates of mediocrities; but a word as to his human aspect—and he *was* a man of wide sympathies—will not be out of place. In politics, he was an ardent admirer of Bismarck, and had little tolerance for the social democrats of latter days; not that charitableness was lacking in his disposition, for many were the kindly acts that he performed. He was fond of children, and when his own family had grown up and he was left alone with his daughter, the cheerful presence of a little niece helped to relieve the gloom that the tragedy of his domestic life had cast over the later years. To music he was almost insensible, and Wagner was to him nothing more than a confusion of sounds. He was present at the first performance of "Siegfried," but left in the middle of the second act with a violent headache. Literature was his one refuge in the intervals of work, and when troubled with insomnia, from which he suffered much, he would pass the hours in his well-stocked library. It is related that at one of his weekly dinner parties, to which all his research students were invited in turn, a youth of an inquiring turn of mind, desirous of probing the extent of the professor's knowledge, read up an almost forgotten author and tackled him on the subject when the cigars were produced; great was the student's chagrin on discovering that it was one of his teacher's favourite authors and at having to sit through an impromptu half-hour's lecture on the author's peculiarities of style. This youth never carried his investigations any further. With his students, Wislicenus was always popular, and though they christened him at one time the "Schmier-Director," from the number of tarry residues that the arbeits were producing, that did not detract from the affection and esteem in which he was held. In his daily round of the research laboratories, he was ever ready with words of sympathy and encouragement that went far to allay the soreness and disappointment of repeated failures; his kindly suggestions have stimulated many to greater efforts.

In 1898, the Royal Society awarded him the Davy medal, and his death makes a vacancy in its list of foreign members.

The loss will be felt not in Germany alone, for his students came from all parts of the world, and while men of science will remember him as one of the founders of stereochemistry, his disciples will look back on him as one of the "influences" of their lives, as a man of broad sympathies and great powers, as an example to emulate and as a memory to inspire.

NOTES.

AMONG the names included in the long list of "Durbar Honours" published on New Year's Day, we notice the following:—Dr. George Watt, C.I.E., officer in charge of the Economic and Art Section of the Indian Museum, Calcutta, has had the honour of knighthood conferred upon him. Dr. W. R. Hooper, C.S.I., President of the Medical Board at the India Office, and Sir Colin Campbell Scott Moncrieff, K.C.M.G., President of the Indian Irrigation Commission, have been made Knight Commanders of the Star of India. Colonel St. George C. Gore, Surveyor-General of India, has been made a Companion of the same order. Dr. B. Franklin, Director-General Indian Medical Service, and Mr. John Eliot, F.R.S., Meteorological Reporter to the Government of India and Director-General of Indian Observatories, have been promoted to the rank of Knight Commanders of the Order of the Indian Empire. Major A. W. Alcock, F.R.S , Superintendent of the Indian Museum, and Prof. J. C. Bose, Presidency College, Calcutta, have been made Companions of the same order. Major David Semple, Director of the Pasteur Institute, Kasauli, has been awarded the Kaisar-I-Hind Medal for Public Service in India.

A GERMAN newspaper records the following exemplary incident, apropos of a recent act of the Kaiser, in appealing to his people for support in a good work. Dr. Dohrn, of Naples, having appealed with little result to the German Minister of Education for financial aid in the extension of his world-famed biological station, sought an interview with the Kaiser. Remarking sympathetically that he could not provide all that Dr. Dohrn desired from his private purse, the Kaiser furnished him with a donation form, headed by himself and a contribution of 1000*l.*, commanding that it should be circulated among the leaders in Berlin society, for return to the Kaiser in person. The result was that within a few days the magnificent sum of 15,000*l.* was subscribed.

MR. HERBERT KYNASTON has been appointed by the Colonial Office director of the Geological Survey of the Transvaal.

M. EDMOND PERRIER has been appointed to the chair of comparative anatomy at the Paris Muséum d'Histoire Naturelle, and M. Pierre Marcellin Boule to the chair of palæontology at the same institution.

A MESSAGE from the *Times* correspondent at Ottawa states that the promoters of the Canadian Marconi Company hope by the end of next summer to have a complete system of wireless telegraphy in operation throughout Canada, extending from the Gulf of St. Lawrence to the Pacific Coast.

MR. MARCONI was entertained at a banquet at Sydney on December 30 by the citizens of Cape Breton Island. Reuter reports that in responding to the toast of his health, Mr. Marconi said that when his system of wireless telegraphy was further developed, it would be possible for ships in distress to signal passing ships. The cable companies, when they began, charged pounds per word; they were now down to shillings, and his starting at ten cents might soon lead to a charge of one cent per word and thus bind England and her colonies more closely together.

THE *Daily Mail* states that Sir Ernest Cassel has offered to give 40,000*l.* towards the study and investigation of ophthalmia in Egypt.

THE death is announced of M. Pierre Laffitte, who, since 1893, has filled the chair at the College de France for the exposition of the general history of science.

AN anti-tuberculosis union for Austria has been formed, with Count Lützow as president. The Vienna correspondent of the *Times* reports that nearly 5000*l.* has already been received in subscriptions, and the Government has promised the fullest support in combating the disease.

THE death is announced of Prof. Dr. Max Schede, professor of surgery at the University of Bonn, to which post he was appointed in 1895. During the time that Prof. Schede was organiser of the surgical section of Hamburg Hospital, he made it his aim to develop the system of antiseptics introduced into surgery by Lord Lister.

MR. OTTO HILGER, whose death we announced last week, was born at Darmstadt on January 20, 1850, where he passed his apprenticeship under his father, who was the master of the mint. At eighteen years of age, he went with his brother, the late Mr. Adam Hilger, to Paris, where they started a workshop, doing much good work for the observatory. At the outbreak of the Franco-German war in 1870, being Germans they had to leave Paris and came to London. In a few years, they were able to start a small business as scientific instrument makers, and the name of Hilger soon became well known in the scientific world. In 1888, Mr. Otto Hilger was appointed by Lord Blythswood to take charge of his private laboratory, where he was until 1897, when the death of his brother compelled him to return to London to carry on the business, though this necessitated leaving partially completed a dividing engine for ruling diffraction gratings which he had been constructing under Lord Blythswood. During recent years, the demand for a high degree of accuracy in scientific instruments has greatly increased, and many men of science will regret the death of a maker who was able to appreciate the necessity for refinements in workmanship.

ON Tuesday, January 13, Prof. Macfadyen will deliver the first of a course of six lectures at the Royal Institution on "The Physiology of Digestion." On Thursday, January 15, Mr. A. J. Evans will begin a course of three lectures on "Pre-Phœnician Writing in Crete, and its Bearings on the History of the Alphabet." The Friday evening discourse on January 16 will be delivered by Prof. Dewar, on "Low Temperature Investigations." On January 23, Dr. Tempest Anderson will lecture on "Recent Volcanic Eruptions," and on January 30 Prof. W. E. Dalby will lecture on "Vibration Problems in Engineering Science."

ACCORDING to a Reuter message from San Francisco, advices from Corinto (Nicaragua), dated December 15, state that the volcano Santiago, near Granada, was then in active eruption. At night the sky was lit up by the volcano, and great havoc had been wrought. Momotombo, on Lake Managua, was also discharging clouds, and the volcano Izalco, in San Salvador, was in more active eruption, clouds and lava issuing from the crater at short intervals. At night a brilliant spectacle was presented, the lava pouring down the side of the mountain looking like a stream of fire. A telegram from Valparaiso states that it is reported that five volcanoes in the province of Llarquihue are active.

THE Moscow correspondent of the *Standard* states that a well-marked record of the recent earthquake at Andijan was obtained by the seismological instruments at the observatory there. The time recorded was 11 a.m., that is, about 8.30 a.m. Greenwich time. Andijan is the second largest town in the "Territory" of Fergana, and had not less than fifty thousand inhabitants at the time of the earthquake.

DURING the past ten months, the Odessa correspondent of the *Standard* points out, Transcaucasia and Transcaspia have been visited by several severe earthquakes. In February last, Schemakha, on the Caspian side of the Caucasus, was laid in ruins by a series of violent earthquakes and volcanic disturbances, in which upwards of three thousand people perished. In July, a similar calamity desolated several districts in Kashgar, involving the loss of some six thousand lives. Those events have now been followed by the destructive series of earthquakes in the districts of Novi-Marghelan and Andijan. According to the latest reports, the loss of life is equally as appalling as that at Kashgar. A few days previous to the dreadful event in Andijan, a series of slight earthquake shocks was felt at Schemakha, the site of the disaster in February last.

PROF. ROBERT KOCH and two assistants, Surgeon Dr. Kleine, of the Prussian Headquarters Staff, and Dr. Neufeld, of the Prussian Institute for Infectious Diseases, are on their way to investigate cattle plague in Rhodesia. To the Berlin correspondent of the *Daily Mail*, Prof. Koch has remarked:—"I contemplate my mission with more or less misgiving, because the Rhodesian plague is of an absolutely mystifying character. Such symptoms as I have so far examined indicate that the disease is wholly different from any species of rinderpest that has ever come under medical observation. What is peculiarly baffling is that the Rhodesian plague dates only from the late war. The cattle imported from Egypt, Australia and South America, which it was supposed would prove immune, have fallen early victims to its ravages, which threaten to denude the entire colony of live stock. While in South Africa, I shall not neglect the opportunity of continuing my tuberculosis experiments with the view of adducing still more positive evidence of my theory of the non-communicability of bovine tuberculosis to human beings, which I, of course, adhere to resolutely."

CAPTAIN BOYD ALEXANDER has just returned to England, after a short visit to the west coast of Africa, where he has been collecting birds and mammals on the islands of St. Thomas and Fernando Po, in the Bight of Biafra. Captain Alexander has obtained altogether nearly 400 specimens, and is expecting more from a collector that he left in Fernando Po. The results of his work as regards birds will probably be published in the *Ibis*.

MR. J. S. BUDGETT, Balfour student of the University of Cambridge, has returned to England from Lake Albert (where he has been engaged in studying the development of the Polypterine fishes) by the Nile route, and will give an account of his expedition at the scientific meeting of the Zoological Society on January 20. Not having been altogether successful in Uganda, Mr. Budgett will probably make another visit to the Upper Gambia, where he has better prospects of obtaining the required information, in the course of the present year.

MR. W. G. DOGGETT writes from Entebbe (November 5, 1902) that he was then preparing to start for the southern frontier of Uganda, to take up his post as naturalist to the Anglo-German Boundary Commission under Major Delmé Radcliffe. The expedition will start from the shores of Lake Victoria at 1° S.L., and will define the boundary between Uganda and German East Africa as far west as the Semliki

River. In the Semliki Forest, Mr. Doggett hopes to be able to obtain fresh specimens of the new African mammal (*Okapia johnstoni*), which are much required at South Kensington.

THE Institution of Electrical Engineers has issued the preliminary programme of the visit to Italy to be made this spring. It is proposed to leave London on April 2, and the first technical visit will be to the Vatellina Railway and power-house on April 4. At Como also the tomb of Volta can be visited the next day. On April 6, the party will leave for Milan, travelling *viâ* the Milan-Varese Electric Railway and visiting the works of Messrs. Tosi, at Legnano, in passing. On April 7, the Paderno power-house will be inspected. On April 8, visits will be made to various places of technical interest in Milan, including the Technical High School, and on the next day to the power-houses at Vizzola and Tornavento. The party will break up on Thursday, April 9, or on the Friday morning (Good Friday).

AMONG the many papers of interest in the December number of the *Geographical Journal* may be specially mentioned Dr. Stein's account of his explorations in Chinese Turkestan, and the readers of NATURE will not fail to note the importance of his discovery of inscribed wooden tablets on the Niya River site. Here, in a small decayed building, he found more than 200 documents on wood of all shapes and sizes. Besides tablets with the Indian Kharoshthi writing, he unearthed several narrow pieces of wood bearing Chinese characters, and many of the former were still protected by the strings with which they were originally tied and bore clay seals. On the seals, we have figures of Pallas Athene, with shield and ægis, Eros and Athene Promachos, and these prove beyond all doubt the influence which classical Western art has exercised even in distant Khotan. Many of the documents bear dates which are mentioned in connection with the names of rulers, and the texts, which seem to be written in an early form of Indian Prakrit, cannot fail to throw great light on the early, unknown history of the district wherein they have been found. It is important that the materials which Dr. Stein has secured should be worked thoroughly, for they may contain information concerning the frequent communication which must have existed between the East and the West during the early centuries of the Christian era.

THE unfortunate fatal accident which occurred at the Fulham Public Baths on December 23 serves to show how dangerous an electric shock may be when the conditions are such that really good contact is made. In this case, two bathers were killed by standing up in their baths and putting their hands on a metal rail running along the top of the partition between the baths; on top of this rail ran the iron pipes containing the electric-supply leads. It seems that there was leakage, possibly in a faulty lampholder, to these pipes, which were insufficiently "earthed." The bathers therefore completed the earth through their bodies to the bath itself, and thus received a shock which, in spite of the fact that the pressure could only have been something like 170 volts, had fatal results on account of the very good contacts which existed. The circumstances of the case are altogether exceptional, and there is absolutely no need for users of electric light to take any alarm. The moral to be drawn is that in an installation of this kind, where it is possible for people to make direct contact between their damp skin and parts of the installation, more care should be taken in design and supervision to prevent any possibility of contact with any live metal.

THE outbreaks of typhoid fever at Winchester and at Southampton again direct attention to the possibility of the typhoid infection being spread through the agency of shell-fish, in these instances through oysters. Dr. Nash, in a report on an outbreak of typhoid fever at Southend-on-Sea, finds that the incidence of the disease was thirty-six times as great among shell-fish consumers as among those who do not eat shell-fish, and expresses the opinion that if the eating of shell-fish were abandoned in Southend, the incidence of typhoid fever would lessen by fully one-half. In the Southend outbreak, cockles were mainly responsible for the spread of the infection.

A LARGE portion of the contents of the January number of *Climate* is devoted to a consideration of the possibility of stamping out malaria. Major Ronald Ross discusses the prevalence of malaria at Ismailia, and comes to the conclusion that if the mosquitoes in the district were even partially eradicated, as might easily be done, malaria would almost disappear. Sir William MacGregor describes the Italian campaign against malaria, and draws attention to the prophylactic use of quinine, the protection of dwellings with wire gauze, the cultivation of the soil and the drainage of swamps as means of diminishing the prevalence of malaria.

AT an international maritime congress recently held at Copenhagen, M. Willaume-Jantzen, subdirector of the Danish Meteorological Institute, contributed an interesting paper on the climate of the coast of Iceland, based on eighteen to twenty-two years' observations at four representative stations—Vestmannoe (south), Stykkisholm (west), Grimsey (north) and Papey (east). Generally speaking, the lowest mean barometric pressure in the north Atlantic lies to the south-west of Iceland, and to the north-east of the island there is another area of mean low pressure, but a little higher than that on the south-west. These two areas determine the prevalent winds on the east coast, which blow with nearly equal persistency from north-east and from north-west. But from its position with regard to the advance of barometric depressions from west to east in the Atlantic, the pressure in Iceland is subject to sudden and great variations, causing frequent storms, the average annual number of days of storm on the east coast being seventy-five. Generally speaking, the summer climate on the coast is fresh and the winter mild, but the latter may be very severe with northerly winds and the approach of polar ice. In some localities, fog is very prevalent; at Berufiord, near Papey, it occurs on 212 days, but at Stykkisholm on nine days only. Rainfall is heavy on the south and light on the north; at Vestmannoe there are 225 days on which rain falls on a yearly average.

THE volume containing the meteorological observations and results for the United States Naval Observatory, Washington, under the direction of Prof. J. R. Eastman, for the year 1901, has been recently received. As in former years, it contains the details of all the observations which are made every three hours during each day. These include the corrected readings of the barometer, and of the wet and dry bulb thermometers, the symbols indicating the character of the clouds, the estimated amount of cloudiness, wind direction and velocity, together with the daily means. The six tables which follow record the results, such as the maximum and minimum temperatures for each month, daily and monthly means of the corrected barometric readings, &c. The volume contains also the meteorological observations made at the same hours at the new naval observatory with a view to determine the difference of the thermometric conditions at the two localities, in order that future records at the new observatory can be properly compared with the records at the old observatory, which extend from 1845 to 1892 inclusive.

WE have received from the editors of the *Photogram* a new edition of a set of cards which are intended for the pocket-book of the photographer. These cards, 5 × 3 inches in size, contain a great amount of very useful information, some of which the practical photographer is sure to find serviceable either in his studio or out in the field. Thus we have a brief guide for correct exposure for various kinds of plates and light, tables of enlargement and reduction for telescopic lenses, how to find south without a compass in order to fix the time of best lighting, the metric and British systems of weights and measures and their connection one with the other, photographic temperatures and a comparison of different thermometer scales, &c. These cards, eight in number, can be obtained from the office of the *Photogram* by forwarding one penny stamp, and they are valuable and useful for the money.

The theory of the dimensions of units in the electrostatic and electromagnetic systems has on various occasions been criticised. A short note dealing critically with dimensions of physical units in general is given by Dr. Ladislaus Gorczyński in the *Physikalische Zeitschrift*, iv. 5. In thermodynamics, the author points out that the dimensions of temperature should not be omitted from the expressions for the dimensions of such quantities as thermal conductivity, specific heat and entropy, and he introduces the dimensions of K and μ into the electrical systems. Herr Gorczyński supports the position assumed by Schreber and disagrees with certain views expressed by Hesehus. In particular, he considers that the assumption of a relation of the form $v = \sqrt{e/d}$ connecting the "v" of electromagnetism with elasticity and density is unjustifiable. The general conclusion is that the conventional treatment of dimensions of units is unsatisfactory, and that it is not at present possible satisfactorily to express the dimensions of all physical units in terms of those of the three fundamental units of length, time and mass alone. It is certainly safer to introduce too many fundamental units the dimensions of which are treated as independent of one another than to cut down the number by regarding the measure of any physical quality as a dimensionless number.

The first report on a chemical and physical study of the soils of Kent and Surrey has been issued by the South-eastern Agricultural College, at Wye, by Mr. A. D. Hall and Mr. F. J. Plymen (1902). The object is eventually to accumulate such a series of analyses of the soils, chemical and mechanical, as will enable the College, when given the situation of any field, to indicate in a general way the kind of manures wanted for each particular crop. The two counties are not much covered with drift deposits, and these are depicted on the one-inch Geological Survey map, but the pressing need of a geological map on the six-inch scale is pointed out. The present report deals only with the soils resting upon the London Clay, Chalk and Gault. By procuring samples of soils from each geological formation in a number of localities, a good general knowledge of them has been obtained. Particulars of these, with methods of analyses, are given. With regard to the Gault soils, it is remarked that the most profitable use to make of them "is to keep them or lay them down as permanent pasture." On both London Clay and Chalk there is considerable variety of soil, and recommendations are made on the cultivation of different areas.

A second edition of Dr. A. J. Ewart's "First Stage Botany" has been published by Mr. W. B. Clive. Several additions and alterations have been made.

The second volume of Prof. Wundt's "Grundzüge der physiologischen Psychologie" has been received from Mr. W. Engelmann, Leipzig. The first volume was noticed a short time ago (November 6, 1902, p. 2), and an estimate of the value of this great work can be obtained from that review. After the work has been completed, a notice of the new volumes will appear.

The three essays which were successful in the recent competition for the erection of a sanatorium for tuberculosis, initiated by His Majesty the King, are reprinted in full in the current number of the *Lancet*, with reproductions of the plans of the buildings. The essays are valuable epitomes of modern knowledge of the cause, prevention and cure of tuberculosis.

We have received from Messrs. Isenthal and Co. their latest catalogue and price list of apparatus for radiography and general electromedical work. The list is a very complete one and shows that the firm is in a position to supply all the apparatus needed in this class of work from single pieces of the simplest type to full sets made up into suitable cabinets. We note also that the firm arranges for courses of lessons in the use of the apparatus for those who desire it.

The "Annuaire du Bureau des Longitudes" for 1903 has been published by M. Gauthier-Villars, Paris. This compact little volume contains, as usual, a mass of information indispensable both to the man of science and to the engineer. Among the contents of the volume may be specially mentioned the contribution by M. R. Radau, on shooting stars and comets, and that by M. J. Janssen, on science and poetry. The discourses delivered at the funerals of MM. Cornu and Faye are also included in this year's issue of the annual.

Three new volumes of the first annual issue of the International Catalogue of Scientific Literature have been received, and are similar in character to those already described. The subjects of the volumes are physics (part i.), meteorology (including terrestrial magnetism) and mechanics. The second part of the catalogue of physical papers will shortly be published and will complete the volume on physics. The two volumes on meteorology and mechanics are each complete in themselves, and the portions of the scientific literature of 1901 not included in them will form a part of the second annual issue of the Catalogue.

Mr. W. Engelmann, Leipzig, has issued two new volumes in Ostwald's series of scientific classics. As is well known, each volume in this series contains one or more papers which have influenced the progress of science, selected from the works of investigators of various nationalities and translated into German when written in other languages. One of the volumes recently published contains series xiv. and xv. of Faraday's experimental investigations in electricity, translated from the *Philosophical Transactions* of 1838 and edited by Dr. A. J. von Oettingen; the other volume (No. 132) contains a translation of two papers by Andrews, on the continuity of the gaseous and liquid states of matter, from the *Phil. Trans.* of 1869 and 1876, edited by Dr. Arthur von Oettingen and Prof. K. Tsuruta.

We have before us the forty-second yearly issue of the *British Journal of Photography*, edited by Mr. Thomas Bedding (Henry Greenwood and Co., Strand), and a glance at this bulky volume, which contains nearly 1600 pages, of which about 600 are text matter, is sufficient to indicate its vigorous and healthy condition. The book is arranged on similar lines to those of its predecessors, and will be found a mine of interesting, practical and useful information on photographic topics. Among some of the contents may be mentioned a very complete list of the officers of photographic societies in the United Kingdom, America and on the continent, a large collection of photographic formulæ and recipes in both the English and metric systems, chapters on photomicrography with bibliography by the editor, a summary of the recent novelties in apparatus, &c., since the publication of the last almanac, practical notes and suggestions of the year, and an epitome of the year's progress, in which is given a *résumé* of the more important discoveries and improvements. Scattered among the text are some excellent reproductions illustrating the behaviour of different lenses and speeds of shutters, and the frontispiece is a contact print on Barnet platino mat bromide paper. The low price of the volume (one shilling) and the useful nature of the contents should render it indispensable to every photographer.

IN the current number of the *Comptes rendus* is a note by Prof. Henri Moissan on a new method of preparing the silicon analogue of ethane, Si_2H_6. This substance was originally obtained by the author, in conjunction with Dr. Smiles, by the partial condensation at $-200°$ C. of an impure silicon hydride prepared by the action of hydrochloric acid upon a silicide of magnesium of undefined composition. Attempts to prepare the same compound from the lithium silicide, Li_2Si_6, by the action of dry hydrogen chloride or a dilute solution of hydrochloric acid were unsuccessful, hydrogen being the only gaseous product. It has now been found that by the gradual addition of lithium silicide to concentrated aqueous hydrochloric acid, the silico-ethane is readily formed in abundance and can be separated by means of cooling to the temperature of liquid air.

THE same number contains an account, by M. F. Bodroux, of another application of the organo-magnesium compounds to organic synthesis. It has been found that if a magnesium alkyl chloride or bromide, prepared in the usual way by the action of magnesium upon an ethereal solution of the alkyl bromide or chloride, is treated with iodine, the alkyl iodide is produced in nearly quantitative yield, together with magnesium iodochloride or bromide. Propyl bromide and isoamyl chloride treated in this way have furnished about 80 per cent. of the theoretical quantities of the corresponding iodides. The reaction is equally applicable to aromatic derivatives, and will simplify greatly the preparation of many monoiodo-derivatives of benzene.

THE much-discussed question of the chemical character of bleaching powder is revived in a recent number of the *Zeitschrift für anorganische Chemie*, which contains a long paper on the subject by Herr Winteler, of Darmstadt. The investigation appears to have arisen from a difficulty which was experienced in making good bleaching powder from electrolytic chlorine, owing to the gas containing considerable quantities of carbon dioxide. The chief conclusions reached by Herr Winteler are as follows. Dry chlorine does not act on dry calcium hydroxide, but in the presence of moisture chlorine water is first formed. This contains hypochlorous and hydrochloric acids, which then act upon the calcium hydroxide. The action involves complicated equilibria, which depend on the temperature, the amount of water present, the rate at which the chorine is passed, &c. Bleaching powder possesses no definite formula, but is a mixture of bodies resulting from the balanced reactions just referred to. It contains basic calcium chloride and basic hypochlorite as normal components, and may contain chloride and hypochlorite as well as hydroxide and the free acids. The decomposition of bleaching powder into chloride and oxygen takes place when there is an excess of hydroxyl ions; on the other hand, an excess of hydrogen ions leads to a decomposition into chlorate and chloride. Working upon this theory of the character of bleaching powder, Herr Winteler shows how it is possible to prepare a good product even when using unpurified chlorine containing 6 per cent. of carbon dioxide.

THE additions to the Zoological Society's Gardens during the past week include a Fennec Fox (*Canis cerdo*) from North Africa, presented by Dixon Bey; two Common Marmosets (*Hapale jacchus*) from South-east Brazil, presented by Mr. J. B. Joel; two Egyptian Jerboas (*Dipus aegyptius*) from North Africa, presented by Miss Chesterman; two Eastern One-wattled Cassowaries (*Casuarius aurantiacus*) from New Guinea; a Blossom-headed Parrakeet (*Palaeornis cyanocephalus*) from India; a Gangetic Trionyx (*Trionyx gangeticus*) from India, deposited.

OUR ASTRONOMICAL COLUMN.

COMET 1902 *d*.—From observations made at Hamburg on December 3 and 11, and at Paris on December 22, Herr Ebell has calculated the following elements and ephemeris for this comet:—

$$T = 1903 \text{ March } 23{\cdot}544 \text{ Berlin M.T.}$$

$$\left.\begin{array}{rl} \omega = & 5^\circ \; 43' \; 32''{\cdot}6 \\ \Omega = & 117 \;\; 29 \;\; 51{\cdot}2 \\ i = & 43 \;\; 54 \;\; 17{\cdot}4 \end{array}\right\} 1903{\cdot}0$$

$$\log q = 0{\cdot}443876$$

Ephemeris 12*h*. *M. T. Berlin.*

1903	α h. m. s.	δ ° ′	log Δ	Brightness.
Jan. 0	7 3 10	+3 47·3	0·2925	1·4
4	7 0 19	+4 54·1	0·2880	1·4
8	6 57 23	+6 4 6	0·2847	1·5
12	6 54 27	+7 18·2	0·2825	1·5
16	6 51 34	+8 34·4	0·2816	1·5
20	6 48 47	+9 52 6	0·2818	1·5

Unit brightness at time of discovery.

On December 22d. 10h. 44m.·3 Paris M.T., the comet was observed in the following position by M. Bigourdan at Paris:—α (apparent) = 7h. 9m. 7s.·4, δ (apparent) = + 1° 32′ 55″.

M. Fayet has found that this comet has the greatest perihelion distance recorded for any comet since that of 1729.

OBSERVATIONS OF VARIABLE STARS.—In No. 3837 of the *Astronomische Nachrichten*, M. M. Luizet, of the Lyons Observatory, publishes his observations of five variable stars and gives his results for each star in a tabular form.

The result of 285 observations of Algol, made between November 18, 1897, and March 12, 1902, indicates a possible slight negative correction to the elements published by Mr. Chandler in No. 509 of the *Astronomical Journal*.

One hundred and fifty-seven comparisons of the irregular variable ε Aurigæ indicate great irregularities in the brightness of this star, which on December 10, 1901, was actually one or two degrees fainter than ν Persei.

One hundred and fourteen comparisons of W Orionis were made between October 26, 1898, and March 19, 1902, and these show that both the duration of the period and the magnitudes at maxima and minima vary greatly. The following elements show the closest agreement to the observations:—

$$\left.\begin{array}{l} \text{Maximum 1899 February 22} \\ \text{Minimum 1899 March 10} \end{array}\right\} + 32\text{d.}{\cdot}32 \text{ E.},$$

but there are several observations which are not reconcilable to this period.

Observations of T Monocerotis and ζ Geminorum have also been made, and tables of their maxima and minima are given by M. Luizet.

THE SPECTRUM OF ε AURIGÆ.—From the investigation and measurement of spectrograms obtained during 1901 and 1902 by Prof. Hartmann and Dr. Eberhard, Prof. H. C. Vogel has found that ε Aurigæ is a spectroscopic binary which has a very long period.

The spectrograms referred to show that the hydrogen lines in the violet region, beyond H and K, stand out with exceptional prominence in this star, and a close investigation as to the cause has led to the conclusion that the spectra of two stars—one of the α Cygni type, the other lying between the limits of Types I. and II. (α Persei, γ Cygni)—are present, the one being exactly superimposed on the other.

OBSERVATIONS WITH A BINOCULAR TELESCOPE.—In *Popular Astronomy*, No. 100, Mr. D. W. Edgecomb describes the performances of the 6½-inch binocular telescope, made by Messrs. Alvan Clark and Sons.

In describing the features of the Moon, Jupiter and Saturn as seen with the binocular, the writer states that the objects